BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of	
Establishing the Digital Opportunity Data Collection	WC Docket No. 19-195
Modernizing the FCC Form 477 Data Program	WC Docket No. 11-10

COMMENTS OF THE CALIFORNIA PUBLIC UTILITIES COMMISSION

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I. INTRODUCTION

The California Public Utilities Commission (CPUC) hereby files these comments on the Federal Communications Commission's (FCC) *Report and Order and Second Further Notice of Proposed Rulemaking* (*FNPRM*) in the above captioned proceedings.[1] The *FNPRM* seeks comments on the implementation of the Digital Opportunity Data Collection (DODC), changes to the collection of mobile broadband and voice subscriptions, and potential sunset of the FCC Form 477.

The CPUC supports the collection of more granular and accurate broadband deployment data through the DODC, as the current census-block based collection results in an overstatement of deployment. Improvements to the FCC's broadband data collection should be fashioned in way to facilitate each of the following uses of, and purposes for, such information, including:

- Guiding federal and state grant policy and grantmaking;
- Providing data for analysis of broadband deployment and adoption by the federal, state, and tribal governments, and other third-party researchers;
- Providing consumers a tool to discern which providers offer broadband to them and at what speeds; and,
- Allowing timely input from state, local, and tribal governments, and the public on inaccuracies in provider-submitted data.

[1] *See* In the Matter of Establishing the Digital Opportunity Data Collection, WC Docket No. 19-195, and Modernizing the FCC Form 477 Data Program, WC Docket No. 11-10 (rel. August 6, 2019).

The CPUC offers the following recommendations to ensure the FCC's new process collects accurate and useful broadband data and helps achieves the above purposes.

II. DISCUSSION

A. Incorporating Location Information into the DODC

The FCC recognizes the DODC's polygon approach by itself will not improve the accuracy of broadband deployment data.[2] Polygons alone are not enough to identify which locations have access to broadband and which lack such access. While a layer of broadband-serviceable locations would be needed for that determination, the FCC intends to proceed with polygon reporting while a layer of serviceable locations is developed.[3] Therefore, the CPUC supports the FCC's proposal to incorporate broadband-serviceable locations into the DODC, and urges it to do so as soon as possible.

The *FNPRM* notes the Broadband Mapping Coalition's efforts to create its own location-specific database.[4] The Coalition is creating a "Broadband Serviceable Location Fabric" (or "Fabric"), which looks to map broadband serviceable locations using address, building, and parcel data.[5] The CPUC generally supports the Coalition's efforts as the Fabric will likely provide granular broadband deployment information compared to census block reporting. However, the FCC should consider expanding the type of

[2] *FNPRM* at ¶ 99.

[3] *FNPRM* at ¶ 31.

[4] *FNPRM* at ¶ 100.

[5] Mapping the Broadband Gap, available at https://www.ustelecom.org/broadband-mapping-initiative-action-center/ for description of the Broadband Mapping initiative.

structures identified on the Fabric. The Coalition's pilot project identifies only a single, primary serviceable location on each parcel. The FCC should identify other locations such as additional dwelling units, businesses, working farm fields, agricultural buildings, at-home manufacturing structures, and other types of structures to provide a more complete picture of where broadband is or is not available.

California contains significant agricultural and rural areas where such additional structures are likely to be present on a parcel and there is value in tracking and including such secondary locations for broadband infrastructure planning and policymaking. While the *FNPRM* states that "a provider is likely to run a single connection (drop) from its network to, for example, a farm, rather than individual connections to all of the structures on the parcel",[6] such an approach may not turn out to provide adequately for the broadband needs at those additional structures. Identifying that such structures exist, their location and whether the ISP makes service available to them will be necessary to determine whether a grant or subsidy program is necessary, and to quantify the costs involved.

Furthermore, to be useful, the final Fabric or any other location database the FCC adopts cannot be "proprietary." All attributes associated with the Fabric must be made available to the public in a downloadable form. Public access to the Fabric's underlying location data would allow public feedback to correct any errors, increasing accuracy of the data. States and third-party researchers likewise would need access to the Fabric's

[6] *FNPRM* at ¶ 101.

served and unserved locations to better analyze digital divide issues. Also, pubic availability of this data would serve the public interest more broadly, as it could, for example, benefit projects that need building location information, such as Next Generation 9-1-1. While a public Fabric may involve more expense than one that would be proprietary, the additional cost is immaterial compared to the total amount of state and federal broadband funding spent to properly address the digital divide.

B. Improving Fixed Broadband Polygon Reporting

Creating, completing, and adopting a final location database like the Fabric will take some time. Until the proposed Fabric is complete, the FCC should implement its fixed broadband polygon reporting by requiring providers to submit polygons that incorporate assessors' parcels.[7]

Assessors' parcel data as an interim solution provides several advantages. First, parcel boundaries are typically publicly available in digital form from each county or

[7] *FNPRM* at ¶ 101. In prior filings in this docket, the CPUC has advocated collecting broadband deployment data at the street address level. (*See*, In re Modernizing the FCC Form 477 Data Program, WC Docket No. 11-10, Comments of the California Public Utilities Commission, at pp. 4-5 (filed Sept. 25, 2017)). While the CPUC agrees with the Mapping Coalition that identifying actual locations by geocoding reported addresses has its own accuracy challenges, the CPUC nevertheless still supports this approach. Small providers may more easily be able to report by street address than by polygon. Large providers can do so as well. In fact, in implementing California's first attempt at broadband mapping in 2007, ISPs both large and small reported broadband deployment by address. "All of the largest wireline broadband providers participated in this effort, and a high percentage of the small providers also submitted the requested data. Of the providers that chose not to participate, most cited resource issues. Through this effort, over 15 million supplied addresses and 7 to 8 million address equivalents were processed. In total, 11 of 12 Incumbent Local Exchange Carriers (ILECs) and 6 of 10 cable companies participated in this project." *See The State of Connectivity*, *Final Report of the California Broadband Task Force, January 2008,* at p. 30, available at http://www.cetfund.org/files/cbtf200801.pdf.

county equivalent assessor's office. Second, parcel data provides a common foundation for nationwide reporting and will ensure the reported data is consistent. To reduce the burden on small providers who may have difficulty creating polygon files, the FCC could allow those providers to submit a flat file of Assessor Parcel Numbers of where they offer service.

In addition, to increase accuracy, the FCC should require providers to include only those parcels in their polygon reporting to which they will provide service at no additional installation cost independent of where the structures are located on the parcel.[8] If a provider is not able or willing to do this for a parcel, the provider should not include that parcel in its reported polygons.[9] Similarly, parcels with multiple dwelling units should be excluded from a provider's polygons if the building(s)'s owner denied the provider the right to serve the building(s).

To avoid ambiguity, reported polygons should incorporate the entire parcel boundary where service is offered instead of just portions of a parcel. This will prevent consumers and policymakers guessing whether the provider will or will not offer service to serviceable locations on a parcel. Removing this ambiguity is especially important for

[8] One of the weaknesses of the current census block reporting is that, even in an area where service is generally available, ISPs may impose large line extension charges to serve locations it deems too far from their current facilities. Using assessors' parcels as the polygon reporting standard, coupled with the FCC's including in its definition of availability the requirement that service be available "without construction charges or fees exceeding an ordinary service activation fee" (*see FNPRM* at ¶ 13) would fix this problem, which has resulted in so much consumer confusion and unhappiness with broadband map accuracy.

[9] While such an approach may understate a provider's coverage (as they are willing to provide service to part of the parcel), the goal here should be to favor such understatement, rather than to perpetuate the current system's bias toward overstating coverage. It is the completion of the Fabric which will allow accurate reporting at a granularity below the parcel level.

receiving valid crowdsource feedback because consumers can definitively know if service is available to them.

C. Mobile Broadband Deployment Reporting

The *FNPRM* seeks comment on how to incorporate mobile wireless broadband coverage reporting into the DODC. The *FNPRM* contemplates collecting shapefiles generated by engineering propagation models and seeks comment on whether specific technical and statistical parameters should be required to be used by providers in their propagation models.[10]

The CPUC does not support the use of propagation modeling by Commercial Mobile Radio Service (CMRS) providers as a basis for asserting mobile broadband coverage. The *FNPRM* acknowledges the CPUC's previous comments recommending drive tests as "the most effective measure of actual mobile broadband service speeds."[11] The CPUC Staff has performed twelve statewide drive tests to measure actual users' experience of mobile broadband service speed and quality for the four national CMRS providers between 2012 and 2017, and has used a statistical interpolation process called kriging to map predicted statewide coverage based on the drive test results.

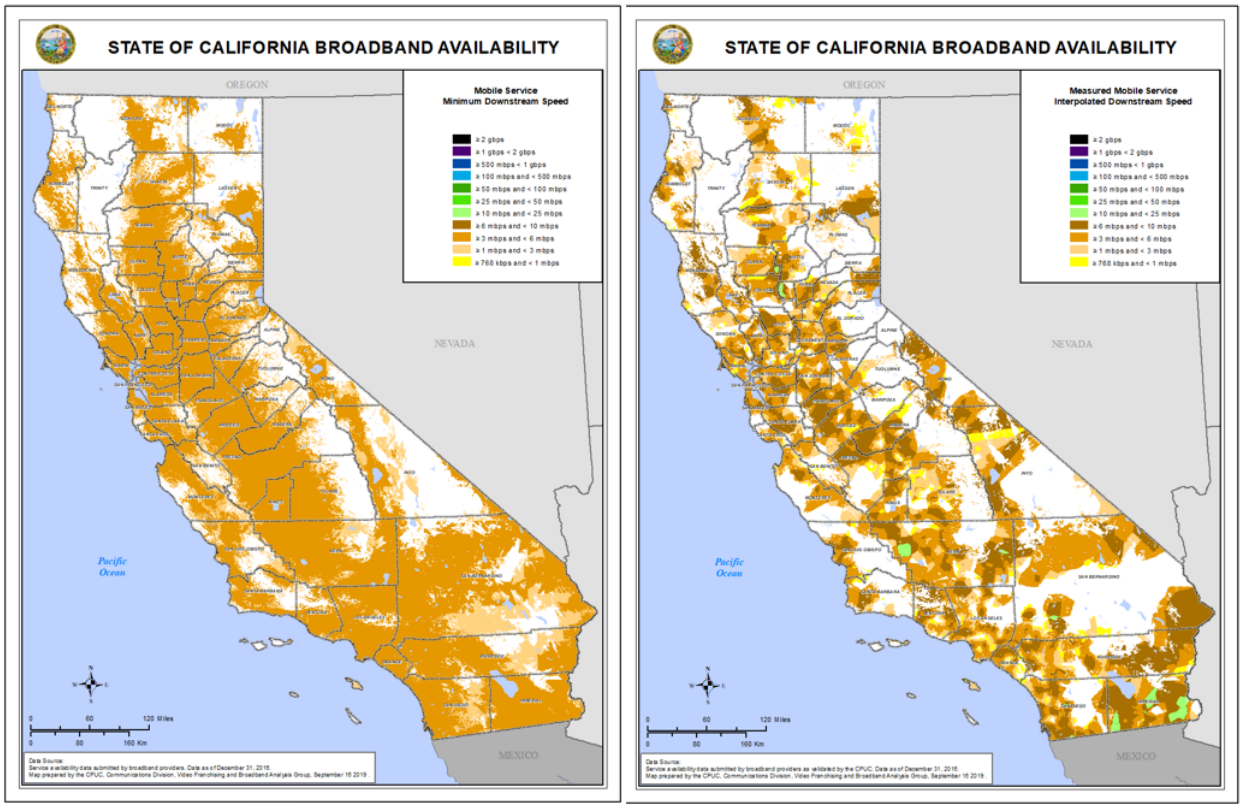
The CPUC Staff has compared its interpolated drive test results to the CMRS providers' coverage shapefiles generated by their propagation models, which they had submitted to the FCC. This exercise shows that the providers' shapefiles are inaccurate and have overstated actual coverage. Shown below in Figure 1 are two maps that

[10] *FNPRM* at ¶¶ 112-117.

[11] *FNPRM* at ¶ 118.

illustrate this. Map A shows coverage represented by the shapefiles submitted by a nationwide CMRS provider. Map B, however, shows the same carrier's service as determined by the CPUC Staff's interpolated drive test data.

Figure 1: Mobile Broadband Service Coverage Maps: Propagation Modeling v. Drive Test Results



A: Coverage Map Using Propagation Modeling **B: Coverage Map Using Drive Test Results**

These maps illustrate the wide gap between drive testing of actual mobile broadband performance and the output of CMRS providers past propagation modeling of their supposed coverage footprint.[12] These maps also demonstrate problems with the CMRS provider's reported speeds. We have found such overstatement of CMRS

[12] The inaccuracy of coverage shapefiles resulting from CMRS propagation models are also vividly illustrated by the problems drive testing exposed in the FCC's Mobility Fund II proceeding.

providers submitted coverage footprints to be the case for all providers in all years we conducted tests, not just for the anonymized single example shown above.

Inaccurate data resulting from propagation modeling will have serious impacts on infrastructure grant programs aimed at eliminating the digital divide. We have no reason to believe that the technical and statistical parameters for propagation modeling on which the *FNPRM* seeks comments will produce more accurate propagation results.

The CPUC also notes that, according to the *ex parte* filing by T-Mobile and Sprint in the FCC docket reviewing their proposed merger, T-Mobile will prove its promised post-merger deployment of 5G service through nationwide drive tests, not through output of its engineering and propagation models.[13] If the FCC recognizes that such propagation is not sufficient track merger-related build out commitments, neither should it be used for determining mobile broadband deployment.

Accordingly, the CPUC reiterates its recommendation that the FCC conduct nationwide drive testing to determine actual mobile broadband speeds and the quality received by consumers. The FCC or third parties not affiliated with the CMRS providers should conduct such testing, and the FCC should accept drive tests conducted by states or their contractors. Drive tests should be designed with sufficient test points to allow interpolations with accuracy of at least one kilometer. The FCC should further adopt transparency requirements, by making both testing methodology and test data publicly

[13] Letter from Nancy J. Victory, Counsel, T-Mobile US, Inc., and Regina M. Keeney, Counsel, Sprint Corporation, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 18-197 (filed May 20, 2019).

available.[14] Data from test points should be interpolated to indicate geographic coverage characteristics between test points, and the interpolation methods should likewise be made public.

D. Fixed Wireless Broadband Reporting

The *FNPRM* seeks comments on improving fixed wireless broadband deployment data. The CPUC recommends the FCC require Wireless Internet Service Providers (WISPs) submit polygons of their available service areas based on assessors' parcels until a fabric of serviceable locations is completed. WISPs should understand that they are committing to serve all reported parcels (or locations) in a normal service interval, and without any additional installation costs.

Since the CPUC began collecting broadband data pursuant to the NTIA's Mapping Grant, obtaining an accurate understanding of fixed wireless service availability has proven to be a difficult problem. To map WISP service availability, CPUC Staff have collected fixed wireless deployment data from WISPs at various points by two methods: (1) by collecting census block data and (2) by collecting engineering data which is entered into commercially available propagation modeling software to create coverage maps.[15]

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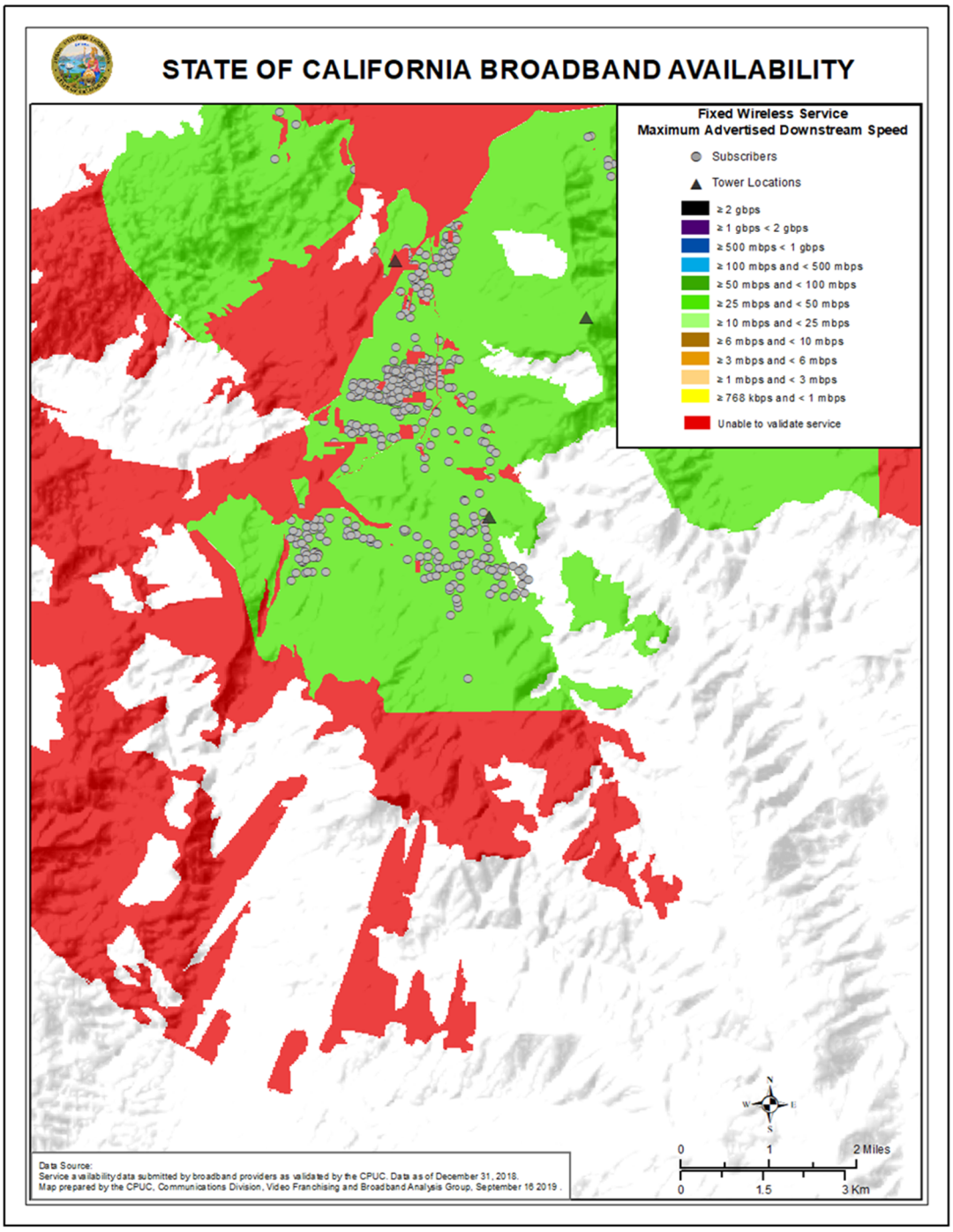
[14] Testing methods should be based on open source protocols such as iPerf, and test not only up and download speeds, but other variables such as latency, jitter and packet loss. Publication of raw test results will allow researchers to calculate statistical metrics such as median, mean and standard deviation, to further deduce the service levels consumers can reliably expect to receive.

[15] The CPUC used propagation modeling software it licensed from EDX for this task, http://edx.com/products/edx-signalpro/.

In both cases, CPUC Staff employed a validation process comparing the reported location of fixed wireless customers with purported availability locations. CPUC Staff found that reported fixed wireless coverage maps often significantly overstate areas where service is available.

Figure 2 shows an example of such a comparison. It illustrates problems of mismatches of purported areas where service is available and areas where customers exist.

Figure 2: Fixed Wireless Broadband Coverage Map



It is not possible to determine from this map whether the WISP's propagation model accurately predicts broadband coverage, or whether such coverage footprint is overstated. But, even if it is correctly predicting where a radio signal can travel, that does

not necessarily equate to the area where a WISP is actually offering service. For example, on this map, the red and green areas show signal propagation. The dots are the locations of customers, and the green areas are the census blocks in which those customers are located. The red areas are those in which it is reasonable to assume the WISP is not marketing its services, even though the radio signals it generates may be present.

One explanation why propagation modeling overstates availability may be that fixed wireless signals can travel longer distances and reach remote terrain that a WISP may not desire to serve due to factors such as long and/or difficult driving distances that would be required for installation and service calls. In the real world, WISPs themselves do not merely rely on propagation maps to determine whether a location can be served, but always perform site visits to verify the ability of a potential customer to receive a signal. Such site visits may determine that the WISPs signal cannot be received at all, or may only be able to be received with the installation of an abnormally high mast at extra cost to the customer.

For these reasons, the CPUC Staff engages in extensive discussions with each reporting WISP, comparing maps of reported coverage areas and reported customer locations.[16] Staff have found that WISPs often report having customers in areas where they do not report service availability, as well as areas where service is shown as available but there are no proximate customer locations. This validation process, though

[16] In fact, the CPUC Staff engages in this validation process with all reporting providers, not just WISPs.

time intensive, can both result in our adding additional areas where service is available, and clipping areas where service does not appear to be offered. It will be important for the FCC to accept and incorporate the results of such state validation efforts in its ultimate broadband availability maps.

E. Proposed Verification Methods and Crowdsourcing

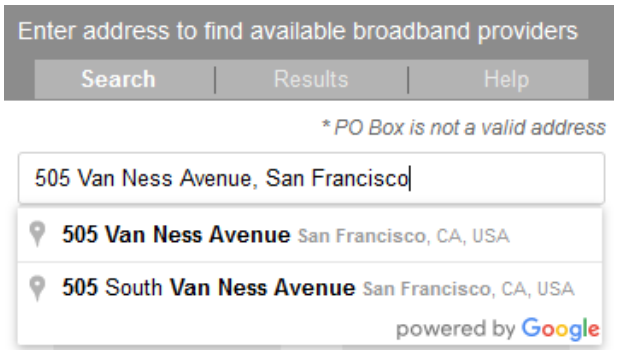
The CPUC supports the FCC's proposal to accept and use data supplied by state, local, and tribal governments to validate Internet Service Provider (ISP) data, and to accept crowdsource data from the public.[17] The *FNPRM* seeks comment on how to best use crowdsourcing data to improve the quality and accuracy of fixed broadband availability data.[18] To ensure crowdsourced data from the public can be appropriately used to correct data submitted by ISPs, specific coordinate point location information should be collected through a map interface from consumers providing their feedback. The Universal Service Administrative Company (USAC) portal collecting consumers' crowdsourced feedback should also collect details about the ISP's service (or lack of), including the purchased service tier with associated speeds, any speed test results, whether the consumer has contacted an ISP to request service and been denied, and any correspondence reflecting that communication. The FCC should consider including a check box on the feedback form authorizing the ISP to provide USAC and/or the FCC information it possesses regarding the service to which the "complainant" subscribes.

[17] *FNPRM* at ¶ 88.
[18] *FNPRM* at ¶ 91.

The *FNPRM* asks whether the USAC portal must include an address lookup function.[19] In order for a crowdsourced feedback mechanism to work, consumers must be able to search the availability database by entering their address and receiving a list of ISPs who assert they provide service at that location, the technology over which service is offered, and the download/upload speed combinations offered.[20] Consumers should then have the ability to click on a specific provider (or multiple providers) whose assertion of service availability they wish to challenge.

California's Interactive Broadband Map has such a feature, shown in Figure 3:

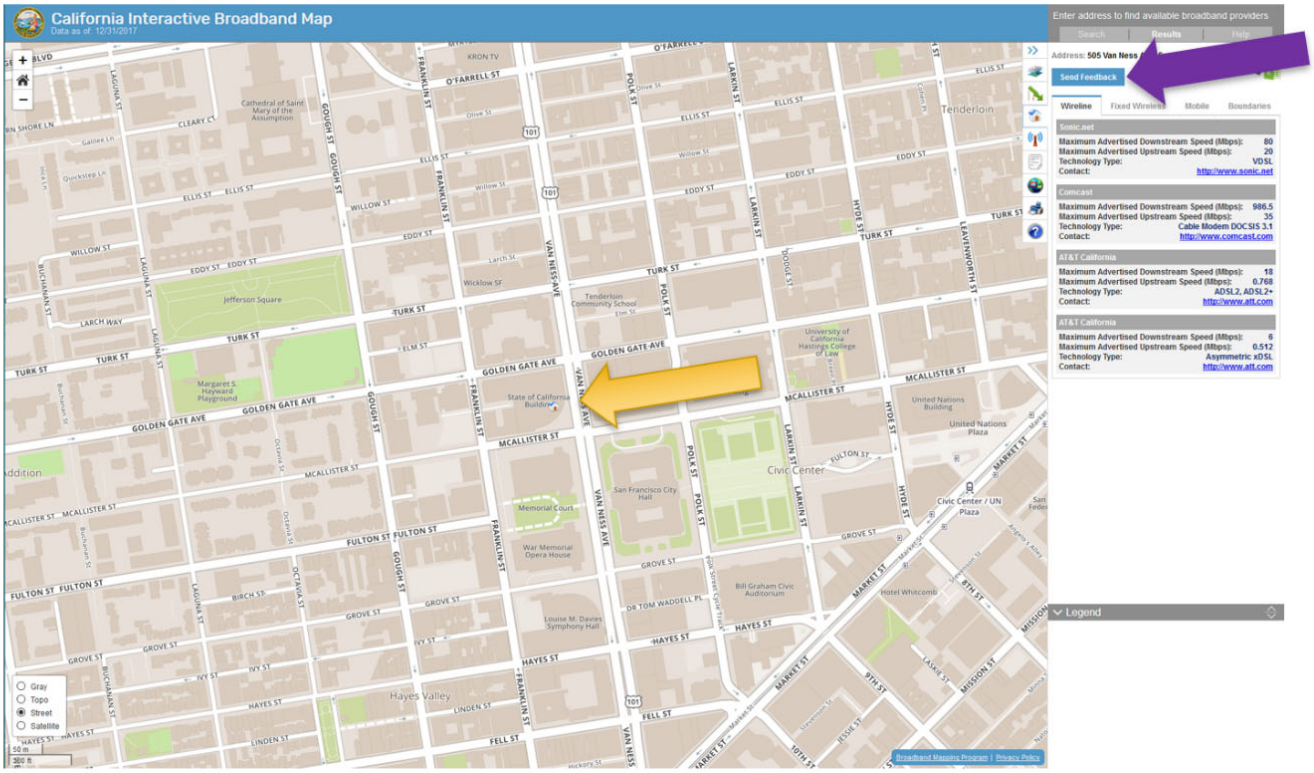
Figure 3: Lookup and Feedback Functions in the California Interactive Broadband Map



[19] *FNPRM* at ¶ 91. 108.

[20] Because there are sometimes issues with geocoding customer-provided addresses, other options, such as the ability for the consumer to drop a pin to designate an availability challenge location should be provided. After implementation of the nationwide fabric of serviceable locations, however, matching a consumer-entered address to a serviceable location should fix any geocoding problems that may exist in the interim.

Check ISPs & Send Feedback

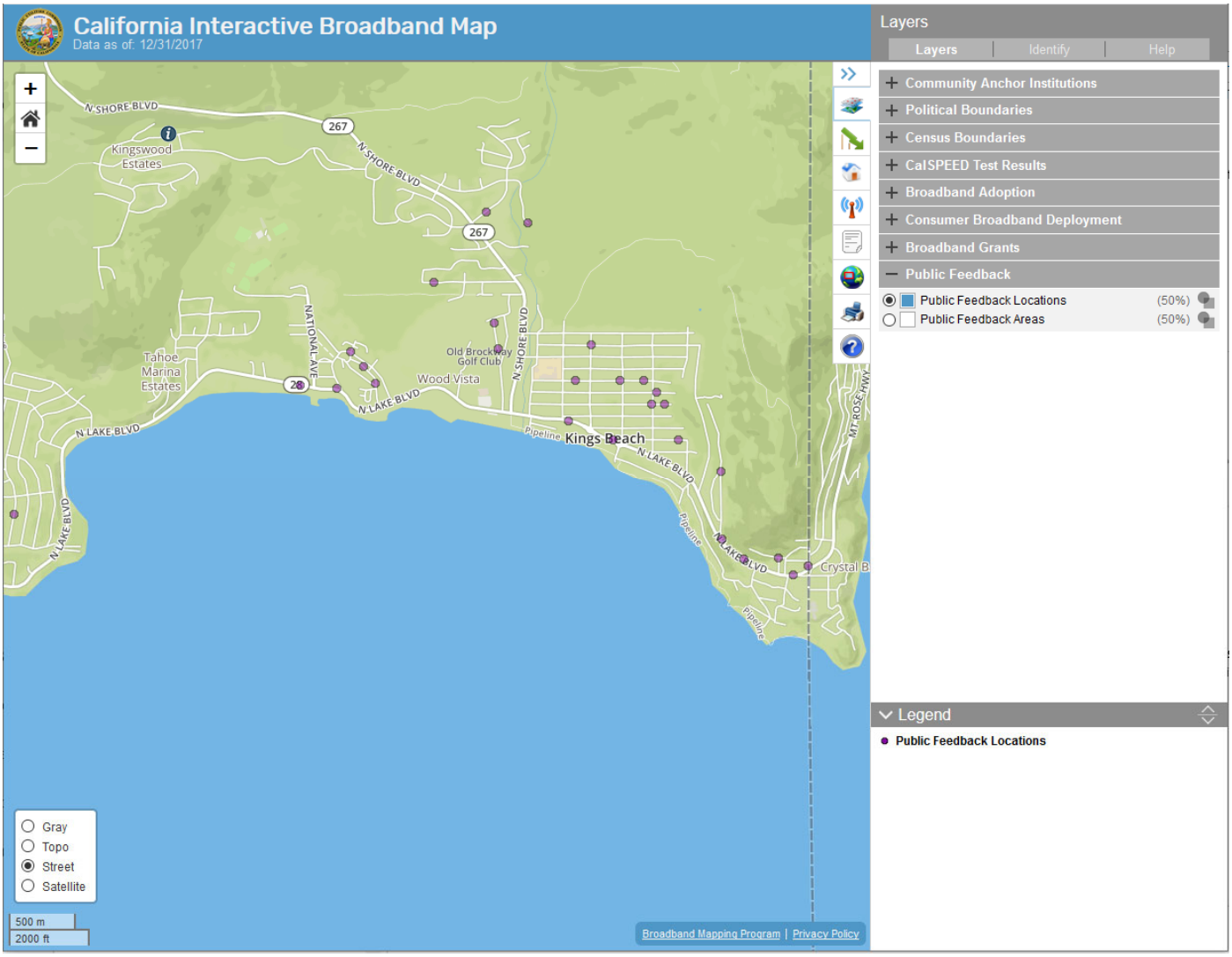


Following the receipt of such individual crowdsource feedback, USAC should have a process to determine the correct state of availability and require any corrections be incorporated into the ISP's next data submission. In the meantime, in the event the crowdsourced feedback is determined to be correct, that information should be shown on the current broadband map. Figure 4 illustrates how consumers' feedback is shown on the California Interactive Broadband Map.[21] Clusters of such verified feedback,

[21] On the Interactive Map, hovering over each point shows the detail of the feedback received.

however, should also be used to expand the area which would be eligible for federal infrastructure grants, if no other ISP provides service there, without waiting for a subsequent data submission cycle.

Figure 4: Consumer Feedback on California Interactive Broadband Map



USAC's data portal should also support the submission of bulk validation data by state, local, and tribal governments. Outlined above are some of the steps CPUC Staff undertake to validate the details of ISP broadband deployment data. This involves comparing areas reported with broadband service with the location of reported broadband

customers.[22] CPUC Staff performs this validation for each technology type an ISP uses to provide service. Additional validation involves comparing presumed loop lengths with those that can support various xDSL technologies and applying crowdsourced consumer feedback and speed test results. Based on this validation process, the CPUC reduces the area an ISP's service is shown as being available on its California Interactive Broadband Map. The CPUC will submit these revised areas to USAC as bulk validation data, and the FCC should use this information to correct its own broadband maps.

For state, local and Tribal governments to provide this critical "ground-truth" function, it is essential that they receive ISP data at the same time ISPs submit their data to the FCC. It will be difficult for states to provide their bulk validation data to USAC in a timely fashion without receiving ISPs' data at the same time the FCC receives it.[23]

F. Form 477 Improvements for Collecting Subscription Data

The *FNPRM* proposes several changes to the collection of Mobile Voice and Broadband Subscription Data that the CPUC supports. It proposes to require providers to report whether subscriptions are data only, voice only, or provided as a bundle.[24] The CPUC supports this change because, as the *FNPRM* states, it will enable better

[22] While the FCC receives data on broadband connections at the census tract level, the CPUC collects such data at the census block level. The CPUC also allows providers to submit address level subscription data instead of block level data, which the CPUC then geomatches to blocks. Small providers often take advantage of this option.

[23] The CPUC Staff currently issues data requests to ISPs requiring them to provide deployment and subscription data each April 1, consisting of data as-of December 31 of the previous year. Although the CPUC Staff can obtain the ISP data from the FCC, the data is generally delayed by as much as a year. Such delayed receipt would eliminate the value of receiving state feedback as envisioned in the *FNPRM*.

[24] *FNPRM* at ¶ 132.

understanding of how consumers purchase and use mobile services, which is important for analysis and data-driven policymaking. The *FNPRM* also proposes to require facilities-based mobile broadband and/or voice service providers to report whether subscriptions are enterprise, government, wholesale, prepaid retail, or postpaid retail.[25] The CPUC supports this change as it will be helpful in competitive analysis of the wireless market.

In addition, the *FNPRM* asks whether new data regarding Internet of Things (IoT) and machine to machine (M2M) services should be collected.[26] IoT/M2M data should be collected, including the technology type of the IoT service, whether it is a uni-directional or bi-directional service, and an indication of the monthly volume of data exchange supported by the service. It is important to understand the extent to which IoT devices are bandwidth intensive (e.g., streaming High Definition security video) or merely bursty narrow-band data (e.g., reporting status of a piece of field equipment), in order to comprehend the impact of the IoT on backhaul networks and future network capacity.

In addition to the changes proposed above, the CPUC urges the FCC to collect broadband and voice subscription data, for both fixed and mobile, at the census block level. Currently, Form 477 requires fixed broadband subscription data reporting only at the census tract level. Granular data at the census block level is necessary for determining levels of service adoption and examining the causes of low adoption and levels of competition. In order to analyze the causes of low adoption (e.g., income,

[25] *FNPRM* at ¶ 133.
[26] *Id.*

education levels, etc.), and to gauge the effectiveness of programs to increase adoption by low income consumers, the FCC should also collect block level data on the number of broadband subscriptions to providers' low income offerings.

G. Form 477 Potential Sunset

Currently, the FCC collects broadband availability data by requiring providers to report all census blocks in which broadband service is available. The FCC expects that the DODC, in the long run, will replace the Form 477 process in collecting broadband deployment data.[27] Currently, using census block based broadband availability data from Form 477, researchers are able to develop a large array of analytics based on race, income, rural or tribal designation, native language, and other factors important to efforts to close the digital divide.

Until the Fabric is completed, continued census block reporting (and connection data reporting[28]) is beneficial as it enables alignment with the United States (U.S.) Census Bureau demographic data, which is published at the census block level.[29] Therefore, the CPUC supports the FCC's decision to continue requiring census block deployment data reporting on Form 477 for the time being.[30]

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[27] *FNPRM* at ¶ 135.

[28] The FCC generally refers to broadband connections on Form 477. "Connections" and "subscriptions" are generally interchangeable terms, and these comments use the term "subscriptions."

[29] When the Fabric is implemented, its locations can be overlaid with a census block layer to enable use of demographic statistics.

[30] *Report and Order* ¶ 11.

Figure 5 is an example of the type of analysis possible by associating census block broadband deployment data with statistics from the U.S. Census Bureau. In this chart, CPUC Staff analyzed urban versus rural broadband deployment in California at advertised speeds using census block data.

Figure 5: California Urban v. Rural Broadband Deployment Analysis

CA Broadband Deployment Analysis
Urban v. Rural

	Urban	Rural	Statewide
Total Population	37,874,469	1,935,222	**39,809,691**
Total Housing Units	13,281,254	876,336	**14,157,590**
Total Households	12,427,786	686,054	**13,113,840**

Speed Benchmarks	Urban Percentage HH Offered Broadband	Rural Percentage HH Offered Broadband	Statewide Percentage HH Offered Broadband	Number of Unserved Urban Households	Number of Unserved Rural Households	Total Unserved California Households	Percentage of California's Unserved Households that are Urban	Percentage of California's Unserved Households that are Rural
>= 6/1	97.78%	72.49%	96.46%	275,472	188,745	464,217	59.34%	40.66%
>= 10/1	97.76%	71.45%	96.38%	278,765	195,837	474,602	58.74%	41.26%
>= 25/3	97.25%	51.44%	94.85%	341,760	333,175	674,935	50.64%	49.36%
>= 100 down	96.91%	41.26%	94.00%	384,360	403,007	787,367	48.82%	51.18%

Source: California Public Utilities Commission, Communications Division
Data as-of 12/31/17, Wireline and Fixed Wireless Technologies

Even though census block reporting overstates deployment (particularly in rural areas), this analysis still illustrates the digital divide. It shows that while 97 percent of urban households have service at 25 Megabits per second (Mbps) download and 3 Mbps upload (25/3), only 51 percent of rural households have 25/3 Mbps speeds. The ability to

tie demographic data with broadband deployment information illustrates for policymakers the presence of a large digital divide impacting California's rural areas. Because of the need of such analysis, continued census block reporting is necessary via Form 477. Once the Fabric is implemented, accuracy of such analysis will improve.

H. Collecting Pricing Information on Broadband Services

The *Report and Order* declined to collect pricing data on broadband services stating that while important, it was not within scope.[31] The CPUC asks that the FCC reconsider this decision on collecting pricing data or open a docket to consider how pricing data on broadband services may be collected. Pricing data is necessary to understand affordability of fixed and mobile broadband services because affordability remains a major factor in the digital divide.

Closing the digital divide requires not only universal deployment, but also affordable services. Moreover, income and affordability are primary drivers of the broadband adoption gap. Through the administration of the CPUC's California Advanced Services Fund, CPUC Staff have found that income is the most significant factor contributing to low broadband adoption rates.[32] Also, the analysis in Figure 6 shows that consumers with higher median household income purchase higher broadband speeds offered by California-franchised video service providers.

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[31] *Report and Order* at ¶ 12, fn. 24.

[32] *See,* CPUC's *Broadband Adoption Gap Analysis*, California Advanced Services Fund Adoption Account (June 2019), available at https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Communications/Reports_and_Presentations/CDVideoBB/BAGapAnalysis.pdf.

Figure 6: Average Household Video Subscriber Income By Download Speed Tier

VIDEO SERVICE PROVIDERS
AVERAGE HOUSEHOLD SUBSCRIBER INCOME BY DOWNLOAD SPEED TIER
(AS OF DECEMBER 31, 2017)

California Average Median Household Income	$72,286

Provider Type	< 6	6 ≤ SPEED < 10	10 ≤ SPEED < 25	25 ≤ SPEED < 100	100 ≤ SPEED < 500	≥ 500
Small LEC	$55,726	$55,775	$56,076	$59,028	-	-
Incumbent Cable	$64,139	$66,329	$66,420	$76,785	$81,327	$98,182
ILEC	$72,884	$73,268	$77,779	$79,933	$81,906	$100,518
New Entrant	$80,641	$53,813	$82,814	$82,023	$92,721	$102,325
All Provider Types	$70,246	$73,104	$75,568	$77,919	$81,350	$100,721

Data Sources and methods:
Broadband Subscription data from Video Service Providers as of December 31, 2017.
Household income data is based on California Department of Finance, January 1, 2018 estimate.
Statewide Household Income is the average of median household income in all census tracts.
Average Household subscriber income by download speed tier is the average of subscriber weighted median incomes in each census tract.
Prepared by California Public Utilities Commission, Communications Division, August 30, 2019

Last year, the National Digital Inclusion Alliance and several other prominent national organizations submitted comments to the National Telecommunications and Information Administration (NTIA) citing several sources of studies establishing cost as a primary barrier to broadband adoption, while also noting the lack of reliable data on the actual price of broadband services.[33]

[33] *See*, NTIA Request for Comments on Improving the Quality and Accuracy of Broadband Availability Data, Docket No. 180427421-8421-01 (May 30, 2018), Comments of New America's Open Technology Institute, Access Humboldt, Benton Foundation, Center for Rural Strategies, Institute for Local Self-Reliance, National Digital Inclusion Alliance, National

In a separate *NPRM*, the FCC proposes to award $20.4 billion by establishing a Rural Digital Opportunity Fund (RDOF), with a goal of ensuring that "high-speed broadband is made available to all Americans quickly, and at an affordable price."[34] Collecting pricing data is critical to understand whether the services offered through the publicly funded networks in the RDOF are affordable for Americans.

The CPUC has consistently urged the FCC to introduce price reporting requirements to Form 477 and reiterates that request now.[35] In order to provide rigorous analysis regarding affordability, the FCC needs reliable data as to the actual prices consumers pay for these services.

The CPUC recognizes that communications services pricing is complex in nature. As service providers move to gain market share, prices are often set at promotional, temporary levels to entice new customers. Often, there are also service limits, such as data caps, that will affect the affordability of the service. The FCC should collect both promotional and permanent service price points and require that service providers report the cost of exceeding any caps or limits on their services.

Hispanic Media Coalition, Next Century Cities, Public Knowledge, and X-Lab (filed July 16, 2018).

[34] In the Matter of Rural Digital Opportunity Fund; Connect American Fund, *Notice of Proposed Rulemaking*, WC Docket Nos. 10-90, 19-126 (rel. August 2, 2019), at ¶ 13 (emphasis added).

[35] In the Matter of Modernizing the FCC Form 477 Data Program, WC Docket No. 11-10, Comments of the California Public Utilities Commission, pp. 9-10 (filed March 3, 2011).

I. Concurrent Form 477 Filing with States

In prior comments in this proceeding, the CPUC has noted the significant delays in obtaining state-specific Form 477 data.[36] For example, the latest California subscription data set on Form 477 available to the CPUC contains data as of December 31, 2017, although the FCC has now received providers' submissions with data as of June 30, 2018 and December 31, 2018. States need access to more current data in order to be able to perform important functions such as studying market competition and broadband deployment, reviewing mergers and acquisitions, and conducting legislative analyses. Current data is also crucial for determining appropriate allocations of public money necessary to address broadband deployment and adoption issues and close the digital divide.

California has previously urged the FCC to require service providers to concurrently file Form 477 submissions with appropriate state commissions, and urges the Commission to do that now.[37]

III. CONCLUSION

The CPUC respectfully asks the FCC to adopt the above recommendations as it shapes the new DODC and changes the Form 477.

[36] In the Matter of Modernizing the FCC Form 477 Data Program, WC Docket No 11-10, Comments of the California Public Utilities Commission, pp. 2-3 (filed September 25, 2017).
[37] *Id*.

Respectfully submitted,

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